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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie Roman Salas, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

In re: WT Docket No. 99-328
Ex Parte Communications

Dear Ms. Salas:

Pursuant to a request of the Ms. Blaise Scinto, on February 1, 2000, Mr. William Gast, Mr. Steve Coston, Ms. Barbara Baffer of Ericsson Inc. and the undersigned communicated via conference call with Mr. Dan Grosh, Ms. Blaise Scinto and Mr. Patrick Forster of the FCC regarding Ericsson's December 17, 1999 request for confirmation that its wireless E911 call completion methodology for dual band, multimode analog/TDMA handsets is consistent with Section 20.921 of the Commission's rules.

The staff of the Commission requested additional information from Ericsson representatives on its call completion methodology. It asked Ericsson to provide more detail on how its Automatic A/B - Roaming - Intelligent Retry system worked; how it avoided the "lock-in" problem; and how it complied with the 17 second call completion parameter. In addition to restating material contained in its December 17 request, Ericsson provided additional technical information on these topics. Attached hereto is a paper prepared by Ericsson which describes in greater detail how Ericsson complies with the call completion rules and covers the information orally provided to the staff in the phone conversation on February 1, 2000.

In addition, the attached document serves as a response to the opposition to Ericsson's December 17 request submitted by the Wireless Consumers Alliance as well as Nokia's comments with regard thereto. Accordingly, this ex parte letter is being

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served on those parties who filed comments with regard to Ericsson's December 17 request.[1]

Two copies of this letter and the accompanying attachment are being submitted for inclusion in the record of this proceeding. Copies are also being submitted to each of the participants in the February 1, 2000 telephone call.

Respectfully submitted,

Ericsson Inc.

David C. Jatlow
Its Attorney

cc: Mr. Dan Grosh (Hand Delivery)
Ms. Blaise Scinto (Hand Delivery)
Mr. Patrick Forster (Hand Delivery)
Wireless Communications Alliance
Nokia Inc.
AT&T Wireless Services, Inc.
CTIA
PCIA

[1] Ericsson's technical staff in Research Triangle Park, North Carolina was delayed in submitting its response to the Wireless Consumers Alliance and Nokia on January 28, 2000 due to severe weather in the North Carolina during the week of January 24, 2000.

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E911 Call Completion Methodology

Reply Comments

In WT Docket No. 99-328, the Commission sought comments on our 911 Call Completion proposal to determine if the method was consistent with the Commission's rules and principles set out by the Commission. Comments supporting the Ericsson proposal were filed by AT&T, Cellular Telecommunications Industry Association (CTIA), Telecommunications Industry Association (TIA), and Nokia, Inc. The Wireless Consumers Alliance (WCA) filed comments in opposition of the proposal. The letter states several misunderstood and incorrect objections toward the Ericsson proposal of which Ericsson wishes to correct.[1]

(1.) In the letter the WCA opposes Ericsson's call completion method for dual band, multi-mode phones which operate on cellular frequencies in the analog and digital (TDMA) mode as well as on PCS frequencies in the digital (TDMA) mode. Ericsson is providing the public with the capability to complete emergency calls timely and accurately by using both the analog and digital channels on which the mobile is capable of operating by utilizing all technologies on all available bands. The dual mode mobile maximizes the likelihood of call completion.

(2.) The WCA also stated that a study in Docket No. 94-102, which was prepared by Giordano Automation Corp., showed that wireless telephone algorithms could be easily modified by the insertion of a few lines of code to enable the handset to select the Strongest/Adequate Signal when operating in the analog mode. Additionally, the Alliance refers to the modification process as a "trivial exercise to insert a few lines of code in the software controlling the analog mode." This is not the case. Anytime software codes for mobile algorithms are changed either through insertion, deletion, or modification of code, a significant amount of man-hours are required for implementation. Software code implementation in the mobile phones affect system design, algorithm design, software design, software implementation, software verification and system verification. In any event, Ericsson mobiles do not rely exclusively on algorithms. Instead, Ericsson mobiles are designed to evaluate the quality of service by using multiple measurements of the received signal strength indicator (RSSI) and downlink bit error rate (BER) to determine the best channel for the user to originate the call on. Hence, the requirement for software modifications to the Ericsson mobile phone algorithm is not required.

(3.) WCA appears to misunderstand the terminology used to describe the word "completion". In response, Ericsson would like to begin by providing the definitions for these words. Call "*completion*" is when the mobile has requested and is granted a traffic channel from the base station, and the mobile's transmitted voice is received by the base station (BS), (i.e. the mobile is on conversation mode). The base station regards call release and call dropped as two independent types of call terminations. The definition of

[1] In its opposition, the WCA refers to statements in made by counsel to Ericsson in documents submitted to the FCC on November 2, 1998 and September 25, 1996. As explained in its "Reply to Opposition to The Petition for Reconsideration of Ericsson Inc." in CC Docket No. 94-102, a copy of which was served on WCA, the statements were made in reference to analog-only phones and should be disregarded here

a *call release* occurs when the user manually terminates the call and a message is sent to the BS to release that traffic channel for availability. *Call drop* occurs when the mobile is on a voice channel and the signal is lost or too low to maintain connection, or the mobile leaves the voice channel for other reasons than the call is released by the mobile station (MS) or the BS. Therefore, the WCA statement that the base station regards the lack of a return handshake signal as a hang-up by the handset is not true. Not seeing supervisory audio tone (SAT) on the voice or traffic channel is not equivalent to a call release. Thus, Ericsson mobile phones originating an analog call are compliant with all the Commission requirements of call completion and lock-in.

The Alliance took opposition to the Ericsson scanning process describing the dual mode phones by stating that the scanning process does not comply and will not increase the call completion rate. This is a result of an incorrect understanding of the Ericsson scanning procedures. In all Ericsson dual-mode mobiles, the mobile follows a described scanning procedure when an emergency 911 call is originated. Ericsson mobile phones are designed to first use the previously acquired service of the current band, (band the user is currently operating on). If access cannot be obtained on this band, the mobile will scan for other systems in the defined emergency scanning order. The order of emergency scanning is as follows: cellular band a , cellular band b, and then Intelligent Roaming Database (IRDB) band. After that sequence the mobile will begin scanning all bands. The Ericsson mobile overrides all programmed negative or forbidden lists (service providers of the same technology without roaming agreements) which results in the ability to scan all bands when originating an emergency call, whereby resulting in the maximum call completion capability.

(4.) The Alliance statement that Ericsson phones can be "locked-in" on a particular base station is also incorrect. In the *Second Report and Order*, the Commission required that "lock-in" should be addressed in all call completion processes. The Commission requires that the mobile "should address the lock-in problem in a reasonable and effective way that substantially reduces or eliminates the likelihood that a 911 call might be locked in on the one system of a cellular carrier that is unable to provide a usable voice communication channel." The Commission recognized that the lock-in problem could be addressed through an algorithm procedure that automatically enables the mobile to switch between the preferred and non-preferred carriers. WCA stated that "the handsets return handshake signal is too weak to be received by the base station" and that "the base station regards the lack of a return handshake signal as a hang-up by the handset" as proof that Ericsson's mobiles could be locked-in to that system. Again, WCA does not understand how Ericsson's mobiles operate. Ericsson mobile phones evaluate the quality of service by checking the RSSI and downlink BER against internal thresholds that by design ensure good quality of service. Ericsson mobiles are designed to provide voice transmission at signal levels lower than the (IS-19) Standards minimum, resulting in the ability to complete the call even in areas where, from a Network planning perspective, the signal would be considered low signal strength. As a practical matter, Ericsson mobiles use multiple measurements of the RSSI and downlink BER to determine the best channel for the user to originate a call on. Thus, the Ericsson mobile is not locked-in to any one channel due to low signal strength.

WCA stated that " As a result, the base station does not connect the emergency call to the landline system" and "when the calling party, in fact, then hands up and re-dials 911, the handset tries the same system again because its software program said that the first call was successfully completed". This is not true. In this situation, the software program does not know if the call originated to the base station (BS) is completed. The mobile station (MS) may retry the same band, but not the same channel. This is because the quality of service evaluation considers the best channel. Every time the MS originates a call, quality of service levels are evaluated. If system checks do not identify a signal that meets the requirements noted, then the MS will seek an alternate band and/or channel.

Ericsson dual mode mobile phones do not have an issue with lock-in. The software algorithm developed for the dual mode mobiles will provide the MS with scanning techniques, automatic switching between the preferred and non-preferred providers, and a constant quality of service check for signal strength and bit error rate on all channels on which the MS is capable of operating.

When the MS has acquired an analog control channel, and the user initiates an emergency call, the MS immediately rescans all control channels to determine the two channels with the best signal strength. If the quality of service on the first channel is below the mobile's minimum acceptable quality of service threshold, the MS selects the second strongest channel for quality of service evaluation. In the event both channels are of insufficient quality, the MS rescans for a better quality of service channel in the next band of service (as described by the emergency scanning procedures). After acquiring a channel with sufficient quality of service, the MS attempts to send the first part of the origination message to the BS. If the BS fails to provide an idle channel (this is a change in the transmission from the BS indicating that the BS has heard the MS and will act to grant it a voice channel), the origination message transmission is interrupted and the MS again rescans for the best quality of service available. If the BS provides an idle access channel message to the MS, then the MS completes transmission of the origination message, and waits to receive an Initial Voice Channel Designation (IVCD) from the BS. If the MS fails to obtain the IVCD from the BS it again rescans for the best quality of service. Once the MS gets the IVCD, it moves to the voice channel assigned by the system, synchronizes in frequency and time with the new channel and then begins sending SAT to communicate to the BS that the MS is on the assigned channel. Given the description above, it can be seen that the evaluation of quality of service at many steps through the origination process and the MS response to poor quality of service (moving to a channel/band that has acceptable quality of service), the Ericsson design does not fall into the "lock in" condition described and is compliant with the Second Report and Order.

When "camped (the mobile is locked on to one control channel) in a digital service, the MS continuously checks neighboring control channels for better quality of service channels. The digital control channel (DCCH) can assign channels to the MS much faster than analog. In an emergency call the MS ignores all programmed SID or

SOC requirements, carrier lists, and pointers that could influence the MS during a call origination. The call is considered complete when the BS receives DVCC (Digital Verification Color Code) from the MS. The continuous check of quality of service channels where the MS is identifying the best channels to communicate on and is moved to those channels eliminates the possibility of being locked-in on one particular channel and meets the requirements of the Commission for avoiding "lock-in".

(5.) The WCA raised concern regarding the Ericsson statement saying that its multi mode mobiles are designed and developed to provide the user with the highest ability of making a call on any of the available technologies deployed by the Network providers. Ericsson mobiles are designed to have the capability to scan the two cellular and six PCS bands (2+6) and access the best channel available, in essence scanning all bands. Though it is true that it may not be possible for an Ericsson mobile (or any other manufacturer's mobile) to communicate with every system in every band, that is irrelevant for purposes of achieving the Commission's goal. Elimination of any band from the scanning process surely reduces the possibility of maximizing the ability to complete a call.

(6.) WCA states that analog systems are the most extensive and prevalent in the United States, and the probability is that if the call can be delivered to the landline carrier at all, it will be accomplished over one of the analog systems With respect to Ericsson multi mode and dual mode mobiles this statement is incorrect. The Industry is moving to digital at an exponential rate. Operators match the features of their mobiles to the infrastructure equipment being deployed in the area of use. The technical reality is that a dual-mode or multi-mode MS offers additional functionality to the user while on a digital system. The mobile user operates the vast majority of time on digital services, (which offers higher capacity, new services, better performance, and other advantages). It is seen in the Industry that the majority of normal calls, (and thus emergency calls as well) made from dual-mode or multi-mode mobile stations will be made on the digital network. This fact also supports our original claim that the digital functionality (as related to emergency calls) in the Ericsson mobiles improve emergency call completion.

(7.) The Alliance also stated that the Ericsson mobile phones do not comply with the Commission's requirement that they determine whether or not the call has been successfully delivered to the landline carrier in 17 seconds. Call processing time is shared between the MS and the BS for all call originations and completions. It should be noted that many wireless system level algorithms follow an Industry practice of "deployed implementation". That is, for service, features, or functions, delivered at a specific performance level, the MS and the BS (and/or network system) both implement pieces to the total solution. Neither typically completely controls the outcome, but instead works together in a way that optimizes safety, reliability, performance, and time to market. Thus, Ericsson believes its MS process is compliant with paragraph 41 of the *Second Report and Order* as described in the next paragraph.

Referring to the Origination process described in Section 4, the timing of each one of the steps can be evaluated. The first step is to begin the Origination and look for the Busy / Idle response (this can take 200ms to 2.8 seconds). In practice, this usually takes less than 1 second. If the process of starting the Origination and waiting for the Busy / Idle transition back from the BS is successful, the MS goes on to complete the Origination message. If it is not successful, the MS abandons this process and scans for a band and channel with acceptable quality of service. Once the MS completes the Origination transmission, it waits to get a message back from the BS. This message could be an initial voice channel designation (IVCD), base station challenge, directed retry, or other system message. If the MS gets any message other than ICVD, then the BS (system) has taken complete control of the origination process (per the IS-553 Standard) and the timing of these processes are not controllable nor measurable by the MS. The MS will wait for the BS message for 10 seconds. Note: This time includes the Busy / Idle time described above. Therefore, from start to this point in the process the timing is 10 seconds or less. In the event that the MS does receive an IVCD within 10 seconds, the MS goes to the designated voice channel (VC) and begins transponding the Supervisory Audio Tone (SAT) that it receives from the BS on that VC. If the MS fails to detect BS transponded SAT during any 5-second period on the voice channel, then the MS will again rescan the control channels for the best quality of service.

Given the handshake nature of the Busy / Idle transmissions, in practice the only failure seen after that step is a catastrophic RF failure after the Origination goes out, but before the ICVD is received. In this case, the MS will declare a failure and rescan for a channel / band with acceptable quality of service. Thus, in practice (as well in the vast majority of design cases, even modeling the BS controlled parts of the process), it is seen that the Ericsson proposal meets the Second Report and Order requirement.

(8.) Nokia Inc., submitted a letter in support of the Ericsson proposal stating that the Ericsson proposal will enhance public safety by increasing the call completion rate for wireless subscribers. It also requested clarification on two issues. First, if a call is dropped or released, will the handset attempt to acquire service on the same band? Ericsson treats dropped calls due to the coverage gaps and calls released where a call is terminated by the end user differently. Ericsson mobiles evaluate the quality of service for signal strength and bit error rate each time at call origination (as well as when rescanning) when determining acceptable channels, in the event that the coverage gap drops the call, or the end user terminates the call.

(9.) Second, Nokia requested clarification on the Ericsson statement in Section 2.2 of its proposal, stating that Ericsson was suggesting "audible and visual feedback are required to satisfy the user notification requirement". Ericsson provided an explanatory sentence that states "the mobile will provide the user with an effective audible and/or visual feedback". Nokia's belief in the latter scenario is what Ericsson intended. Ericsson supports both audio and/or visual feedback for the end user when an emergency number is dialed.

The paragraphs above show that Ericsson complies with the Commissions *Second Report and Order* for emergency call processing methodology. However, recognizing the focus placed on the call completion timer by the Commission, Ericsson understands that the Industry practice of a distributed (handset and Base station) implementation may not be acceptable to the Commission. If the handset is to exclusively control this time (moving away from Industry practice), and thus insure compliance under any and all network conditions, then that can be accomplished by Ericsson through further design, development, and verification of the MS. If this is required by the Commission, Ericsson will need an additional 4 months after the February 13, 2000 date to commercialize this requirement.